ANNOUNCEMENT.

BY THE DIRECTOR.

Although bearing the date of January, this bulletin will not be ready for distribution before the first of May. The reason for this delay is that the bulletins of this Station are published by the State, and the press of other work during the session of the Legislature has caused the Station's work to be laid aside; consequently, the annual report for 1890, which has been in the hands of the State Supervisor of Public Printing since January, is still unpublished, and a bulletin on oats and other matter which it was intended to publish in March has been withdrawn from publication for the present, because it could not be got out in season to be of any service to farmers this year.

The publication of the Station's bulletins has hitherto been provided for from year to year by a joint resolution; but through the effort of Hon. T. E. CROMLEY a law has been enacted at the present session of the General Assembly, providing for the permanent publication of the bulletin, in an edition of 60,000 copies. It is hoped that this law will enable the Station to secure more prompt publication hereafter.

EARLIER PUBLICATIONS.

Annual Reports.—The Station can no longer supply complete files of its annual reports, except to public libraries, and to these only in limited number. Copies of the reports for 1884, 1885 and 1886 will be sent to any applicant on receipt of seven cents each for postage, and a limited number of the report for 1888 can be furnished free of postage.

Bulletins.—The first series of the Station's bulletins comprises those issued under the State organization, during the years 1882–87, inclusive. These, with one exception, were simply newspaper slips, intended to secure publication in the press of the State of the principal results of certain experiments, at an earlier date than was possible in the annual reports. These bulletins were afterward incorporated in full in the annual reports, and no complete file of them was preserved, not even for the use of the Station itself. Hence no back numbers of this series of bulletins can be supplied.

The second series of bulletins began with the reorganization of the Station under the Hatch act, in April, 1888. The first volume of this series comprises seven numbers, dated in 1888. These issues were incor-

porated in the annual report for 1888. Separate copies of numbers 2, 3, 5, 6 and 7 can still be furnished.

Volume II, second series, comprises eight numbers, dated March, April and May, June, July, August, September, November and December, 1889. Of the first two numbers of this volume our supply is entirely exhausted, and only a limited number of subsequent issues can be furnished. All bulletins are sent free of postage.

Volume III, second series (1890), will comprise eleven numbers when completed, the annual report not yet being published. Complete files of this volume will be sent free on application.

Two numbers have been issued in Volume I, Technical series, viz.: No. 1, October, 1889, containing articles on "Preparatory stages of the 20-spotted Ladybird"; "Studies in pond life," and "A partial bibliography of insects affecting clover"; and No. 2, May, 1890, containing articles on "Flowering plants on grounds of the Ohio State University"; "Fourth contribution to life history of little known plant lice," and "Descriptive catalogue of the shells of Franklin county, Ohio."

Copies of these will be sent free of postage to all applicants.

WHAT THE STATION IS DOING.

The leading features of the work of the Station are:

The comparison of varieties of grains, fruits and garden vegetables.

The control of injurious insects, and of the rusts, smuts and other diseases of plants.

The study of contagious, parasitic and epizoötic diseases of domestic animals.

The study of the principles which govern the economical maintenance of soil fertility.

The sole object and purpose of this work is to bring to the assistance of the farmers of Ohio more accurate methods of investigation, and a more extensive acquaintance with the relations of technical science to agriculture, than are attainable in ordinary farm practice; and to this end the Station not only offers to farmers the published results of its work, but its officers are always glad to receive, and will answer as promptly as possible, any questions relating to problems in their several fields of work.

All correspondence should be addressed—EXPERIMENT STATION, COLUMBUS, OHIO.

BULLETIN

OF THE

OHIO AGRICULTURAL EXPERIMENT STATION.

VOL. IV, No. 1. SECOND SERIES. JANUARY, 1891.

ARTICLE I. EXPERIMENTS WITH CORN—CONTINUED.

INTRODUCTION.

This article reports in detail the investigations conducted in the several experiments with field corn during the year 1890, together with a series of summaries, collated from work of a similar kind conducted by the Station in previous years.

1. COMPARATIVE TEST OF VARIETIES.

The land upon which the variety test was made is a rich alluvial soil (bottom land), which is subject to overflow from the river. It had been in corn and oats the two previous seasons; this was therefore the third grain crop taken in succession from this piece of land. During April the entire piece was under water, and the continued rains of that month made it impossible to prepare the land until after the middle of May; the final preparation was not concluded until the 28th of May, the ground being then only in fair condition. The corn was planted on the 29th of May. The ground was still cold, and although the seed had not been planted sparingly we discovered, ten days later, that we had a very poor stand of corn, so that on the 12th of June we found it necessary to replant the entire list of varieties, with the exception of the Hickory King, which, on account of bad seed, was given up as a failure.

The early part of the corn season of 1890 was the opposite of that of 1889. The rainfall of 1889 was exceedingly light, while in 1890 it was very much above the average for the months of April, May and June; but the later corn-growing months of July and August, 1890, were remarkable for light rains.

This unevenness of rainfall, together with the short season, cut the corn crop quite low. The average yield of the forty plots of dent corn in 1889 was 69.5 bushels; while the average yield of forty-four plots of the same class in 1890 was 57.6 bushels, showing a difference of 11.9 bushels per acre as harvested. The average yield of air-dried corn in 1889 was 60.9 bushels, while in 1890 it was 52.9 bushels, showing that the difference between the corn as harvested in 1889, and the dry corn of the same year was greater than the difference between the corn harvested in 1890, and the air-dried corn of the same season. This indicates simply that the corn, when husked in 1890, was more nearly matured than in the previous year.

The corn plots in the variety test of 1890 contained, without exception, one-tenth acre each. They were 272½ feet long by 16 feet wide. The general arrangement of these plots and the yield per acre, as harvested, is shown in Diagram I.

Table I shows the shrinkage of each variety in drying, the weight of shelled corn from 100 pounds of ears of each variety as harvested, and the weight of cobs, together with the weight of a bushel of shelled corn of each variety. The one hundred pounds was weighed out when husked, and placed in a loose box in a mouse-proof room, where it remained to dry until about the 1st of February, when it was again weighed and some of the data as given in Tables I and II determined. It is perhaps necessary to say that the bushels and fodder per acre, as given in Table II, are determined by getting the average weight of the ears of corn and stalks of fodder as grown, and from that weight calculating the yield corrected to a full stand, which would be 960 ears with 960 stalks for each tenth-acre, or the equivalent of 9,600 stalks per acre. It is not possible to get an absolutely perfect stand, neither is it possible to have every stalk bear an ear, but we must expect more or less barren stalks. I have collected some data bearing upon the point of barren stalks, but not sufficient to justify conclusions. Upon this subject, Prof. G. E. Morrow of the Illinois Experiment Station, says:

"Barrenness does not seem to be a variety characteristic, but depends upon the season and the thickness of planting. The stalks had many more ears in 1889 than in 1888 and 1890. There were fewer barren stalks where corn was planted at the ordinary rate of 12,000 kernels per acre than at either thicker or thinner planting. When four times as many kernels were planted, one-half the stalks were barren."*

*Bulletin No. 13, Agricultural Experiment Station of the University of Illinois, Feb., 1891, p. 390.

VARIETIES OF CORN.—DIAGRAM I.—Arrangement of Plots and Yield Per Acre.

1 bushel=70 lbs. ears.

Plot No.	Name of variety.	Bushels.
1	Briar Crest Beauty	79.5
2	Chester County Mammoth	80.7
3	Leaming Improved	61.6
4	Leaming	65.1
5	Murdock's Yellow Dent	47.4
6	Woodworth's Yellow Dent	44.6
7	Farmers' Favorite	77.9
8	Golden Beauty	74.0
9	Cloud's Early Dent	72 9
10	Golden Dent	76.1
11	Big Buckeye	62 0
12	Edmund's Premium Dent	48.0
13	Clarage	55.1
14	Hess' White	64.2
15	Wisconsin Yellow Dent	40.3
16	Pride of the North	52.9
17	Mammoth White Dent	64.3
18	Mammoth White Surprise	79.6
19	Beard's Pearl White	47.6
20	Early White Dawn	54.4
21	Champion White Pearl	61.9
22	Mastodon	61.4
23	Queen of the Prairie	43.5
24	North Star Yellow Dent	58.4
25	Wisconsin White Dent	49 5
26	Cranberry White	50.0
27	Old Cabin Home	57 6
28	Maryland White Dent	62 5
29	Blount's White Proline	65.4
30	Hickory King	Failure.
31	Queen of the North	30 4
32	Iowa King	63 3
33	Early Butter	35.9
34	Champion White Pearl	62.1
35	Riley's Favorite Yellow Dent	49.0
36	Butcher Corn	67.9
37	Bullock's White Prolific	67.1
38	King of the Earlies	29 9
45	Brazilian Flour Corn	22 6

CORN.—TABLE I.—SHRINKAGE IN DRYING—PERCENTAGE OF SHELLED CORN—WEIGHT OF COBS—WEIGHT OF BUSHEL OF SHELLED CORN.

Plot No.	Class and variety.	Weight when husked.	Number of ears.	Weight Feb. 1.	Loss.	Weight of shelled corn.	Weight of cobs.	Weight per bushel shelled.	Color of cob.
	Large Yellow Dent.								
		Pounds.		*Pounds.*	*Per cent.*	*Pounds.*	*Pounds.*	*Pounds.*	
11	Big Buckeye	100	171	88.5	11.5	72.7	15.8	49.5	Red.
1	Briar Crest Beauty	100	147	86.5	13.5	69.0	17.5	50.2	"
2	Chester County Mammoth	100	139	86.0	14.0	78.5	17.5	48.1	"
9	Cloud's Early Dent	100	149	89.7	10 3	74.7	15.0	49.0	"
8	Golden Beauty	100	158	87.5	12.5	72.0	15.5	49.3	Mixed.
10	Golden Dent	100	153	85.5	14.5	68.0	17 5	47.0	"
4	Leaming	100	182	91.7	8.3	75.7	16.0	52.7	Red.
3	Leaming Improved	100	178	92.0	8.0	75.5	16.5	54 7	"
5	Murdock's Yellow Dent	100	246	95.7	4.3	79.0	16.7	52.4	"
6	Woodworth's Yellow Dent	100	246	95.0	5.0	76.5	18.5	51.5	"
	Medium Yellow Dent.								
13	Clarage	100	216	93.0	7.0	77.5	15.5	53 2	Red.
33	Early Butter	100	283	95.7	4.3	83.7	12.0	52.6	"
12	Edmund's Premium Dent	100	230	94.0	6.0	80 5	13.5	51.6	"
7	Farmers' Favorite	100	150	88.0	12.0	71 7	16.2	49.2	Mixed.
38	King of the Earlies	100	.....	98.0	2.0	85.5	13.5	53.7	Red.
22	Mastodon	100	161	87.5	12.5	72.3	14.7	48.4	Yellow.
24	North Star Yellow Dent	100	261	97.0	3.0	82.0	15.0	53.0	Red.
16	Pride of the North	100	256	96.0	4.0	80.5	15.5	51.5	"
31	Queen of the North	100	339	97.0	3.0	84 0	15.2	51.5	"
23	Queen of the Prairie	100	253	96.0	4.0	78.7	17.2	54.5	"
35	Riley's Favorite Yellow Dent	100	.....	93.5	6 5	76 2	17 3	43.7	"
15	Wisconsin Yellow Dent	100	250	94.0	6.0	80.5	13.5	53.8	"
	Mixed Dent.								
36	Butcher Corn	100	165	91.5	8.5	72.0	19.5	52.1	Mixed.
26	Cranberry Dent	100	220	85.5	14.5	72.2	13.3	51.3	"

CORN.—TABLE I—Concluded.

Plot No.	Class and variety.	Weight when husked.	Number of ears.	Weight Feb. 1.	Loss.	Weight of shelled corn.	Weight of cobs.	Weight per bushel shelled.	Color of cob.
	Large White Dent.	*Pounds.*		*Pounds.*	*Per cent.*	*Pounds.*	*Pounds.*	*Pounds.*	
87	Bullock's White Prolific	100	.....	90.0	10.0	68.0	22.0	47.5	Mixed.
21	Champion Pearl White	100	187	90.5	9.5	74.2	15.0	49.0	"
84	Champion White Pearl	100	170	95.0	5.0	77.5	17.5	49.9	White.
14	Hess' White	100	183	91.5	8.5	75.5	16.5	51.7	Red.
82	Iowa King	100	172	87.5	12.5	68.5	19.0	48.0	Mixed.
17	Mammoth White Dent	100	173	92.5	7.5	75.5	17.0	51.6	White.
18	Mammoth White Superior	100	138	77.5	22.5	59.7	17.8	46.5	"
	Medium White Dent.								
19	Beard's Pearl White	100	243	94.0	6.0	78.5	15.5	50.5	White.
29	Blount's White Prolific	100	251	83.2	16.8	68.0	15.2	54.0	"
20	Early White Dawn	100	212	92.5	7.5	77.5	15.0	51.8	Red.
30	Hickory King	100	Failure.	.....	.....	.....	.....	.....	.....
28	Maryland White Dent	100	173	82.0	18.0	68.0	14.0	49.7	White.
27	Old Cabin Home	100	193	84.0	16.0	72.5	11.5	49.9	"
25	Wisconsin White Dent	100	250	90.5	9.5	74.0	16 5	50.0	"
	Flour Corn.								
.....	Brazilian	100	349	90.0	10.0	70.7	19.3	48.0	White.

CORN.—TABLE II.—Yield per Acre of Grain and Fodder Corrected to Full Stand.

1 bushel=70 lbs. ears in November and 68 lbs. ears in January.

Plot No.	Varieties.	Yield per acre as harvested.		Yield as weighed in January.	Date of cutting.	Days from planting to cutting.	State of maturity.
		Grain.	Stalks.				
	Large Yellow Dent.	*Bushels.*	*Pounds.*	*Bushels.*			
11	Big Buckeye	62.0	5,124	56.5	Sept. 18	112	Ripe.
1	Briar Crest Beauty	79 5	4,715	70.8	" 30	124	Unripe.
2	Chester Co Mammoth	80.7	5,039	71.4	" 30	124	"
9	Cloud's Early Dent	72 9	4,142	67 4	" 29	123	Ripe.
8	Golden Beauty	74 0	4,456	66.7	" 29	123	Unripe.
10	Golden Dent	76.1	3,514	67.0	" 29	123	"
4	Leaming	65.1	2,928	61.5	" 18	112	Ripe.
3	Leaming Improved	61.6	3,006	58.3	" 18	112	"
5	Murdock's Yellow Dent	47.4	2,676	46.7	" 18	112	"
6	Woodworth's Yel. Dent	44.6	1,814	43.7	" 14	108	"
	Medium Yellow Dent.						
13	Clarage	55.1	2,408	52.8	Sept. 18	112	Ripe.
33	Early Butter	35.9	1,677	35.4	" 18	112	"
12	Edmund'sPremium Dent	48.0	2,303	46.4	" 18	112	"
7	Farmers' Favorite	77.9	4,417	70 6	" 29	123	Unripe.
38	King of the Earlies	29.9	1,314	30.1	" 10	103	Ripe.
22	Mastodon	61.4	2,934	55 3	" 30	124	Unripe.
24	North Star Yellow Dent	38.4	1,246	38 3	" 18	112	Ripe.
16	Pride of the North	52.9	3,186	52.2	" 18	112	"
31	Queen of the North	30.4	1,379	30.3	" 18	112	"
23	Queen of the Prairie	43.5	1,799	43.0	" 18	112	"
35	Riley's Favorite Y. Dent	49.0	2,208	47.2	" 18	111	"
15	Wisconsin Yellow Dent	40.3	1,777	39.0	" 18	112	"
	Mixed Dent.						
36	Butcher Corn	67.9	3,545	64.0	Sept. 29	122	Ripe.
26	Cranberry Dent	50.0	2,251	44.0	" 29	123	Unripe.
	Large White Dent.						
37	Bullock's White Prolific	67.1	4,009	62.2	Sept. 29	122	Unripe.
21	Champion Pearl White	61.9	2,856	57.7	" 18	112	Ripe.
34	Champion White Pearl	62.1	2,586	60.8	" 29	122	"
14	Hess White	64.2	3,034	60.5	" 29	123	"
32	Iowa King	63.3	2,820	57.0	" 29	123	Unripe.
17	Mammoth White Dent	64.3	2,870	61.3	" 29	123	Ripe.
18	MammothWhiteSurprise	79.6	5,306	63.5	" 29	123	Unripe.
	Medium White Dent.						
19	Beard's Pearl White	47.6	2,384	46.1	Sept. 18	112	Ripe.
29	Blount's White Prolific	65.4	3,285	56.1	" 29	123	Unripe.
20	Early White Dawn	54.4	2,312	51.8	" 18	112	Ripe.
30	Hickory King	Failure.					
28	Maryland White Dent	62.5	3,287	52.8	Sept. 29	123	Unripe
27	Old Cabin Home	57.6	6,162	49.8	" 29	123	"
25	Wisconsin White Dent	49.5	1,494	37.7	" 18	112	Ripe.
	Flour Corn.						
45	Brazilian	22.6	3,552	20.9	Sept. 29	122	Unripe.

Table III gives, in condensed form, the results of a duplicate test conducted in three different counties of the State; one in the northeast, one in the southwest, and the other in the central part of the State. The object of this test was not so much to get the comparative yield of the four varieties tested, as to determine the possibility of their maturing on different soils or in different localities. The Briar Crest Beauty and Chester County Mammoth have been regarded as unsafe varieties to grow on the Station farm, because of their requiring a longer season to reach maturity than some of the other dent varieties. Previous experiments have indicated that they did not mature well on other Ohio soils, and these experiments are confirmed by this test, for the column on the right shows that neither of the varieties above mentioned has matured where tested last year.

Mr. Wilder, of Trumbull county, in his report says that both Briar Crest Beauty and Chester County Mammoth moulded so badly in the shock that they were unfit for use. Mr. T. M. Lawrence, of Butler county, also tried the Briar Crest Beauty, and reports that it failed to mature. It should be observed that in both Preble and Trumbull counties these varieties had about five months in which to grow, or fully one month longer than an ordinary corn season.

The Leaming and Improved Leaming have ripened well where tried in the State. Another object in using these two was to determine whether the latter had any merits over the former. The experiment has not settled the question, for in two cases the results favor the Leaming, while in the others they favor the Improved Leaming.

CORN.—TABLE III.—Variety Tests on Different Soils.

Variety.	By whom grown.	County.	Kind of soil.	Actual yield per acre.		Days from planting to cutting.	State of maturity.
				Corn.	Fodder.		
				Bushels.	*Pounds.*		
Briar Crest Beauty	Joseph Poos	Preble	Black loam	49.6	2,620	164	Unripe.
" "	D. H. Wilder	Trumbull	Light clay	.....	.....	153	"
" "	W. H. Meeker	"	Light loam	55.3	7,420	128	"
" "	Station	Franklin	Alluvial	59.7	3,900	124	"
Chester Co. Mammoth	Joseph Poos	Preble	Black loam	58.4	3,750	164	Unripe.
" "	D. H. Wilder	Trumbull	Light clay	.....	.....	153	"
" "	W. H. Meeker	"	Light loam	46.7	7,680	128	"
" "	Station	Franklin	Alluvial	62.0	4,520	124	"
Improved Leaming	Joseph Poos	Preble	Black loam	29.6	1,520	137	Ripe.
" "	D. H. Wilder	Trumbull	Light clay	85.0	4,900	155	"
" "	W. H. Meeker	"	Light loam	70.3	6,160	112	"
" "	Station	Franklin	Alluvial	46.3	2,365	112	"
Leaming	Joseph Poos	Preble	Black loam	25.7	1,280	137	Ripe.
"	D. H. Wilder	Trumbull	Light clay	80.0	5,280	155	"
"	W. H. Meeker	"	Light loam	91.0	6,390	112	"
"	Station	Franklin	Alluvial	50.7	2,460	112	"

Table IV shows the averages by classes, as calculated from previous tables, and changes the order of productiveness from that of last year; the large white dent varieties taking the lead this year, followed by the large yellow dents, mixed dents and medium white dents in the order named, the medium yellow dents taking last place as a class. The Brazilian flour corn was given one more chance, with the usual result—failure to mature.

The fodder in all the corn work of 1890 was in good, dry condition when weighed, and the figures given may be regarded as reliable and a fair criterion by which to measure the amount of fodder in the several varieties, as well as in the other experiments herein given.

CORN.—TABLE IV.—AVERAGES OF TABLES I AND II BY CLASSES.

Class.	No. varieties.	Grain.				Yield of stalks.	Days from planting to cutting.
		Yield as harvested.	Yield of dry corn.	Weight per bushel shelled.	Weight of cob per 100 lbs. ears.		
		Bushels of 70 lbs.	*Bushels of 68 lbs.*	*Pounds.*	*Pounds.*	*Pounds.*	
Large Yellow Dent.....	14	61.3	57.2	51.3	17.0	3,328	115
Medium Yellow Dent..	13	47.0	45.3	52.6	15.0	2,205	113
Mixed Dent.....	2	58.9	54.0	51.7	16.4	2,898	123
Large White Dent.....	8	64.7	59.2	49.5	17.5	3,238	121
Medium White Dent..	7	56.2	49.0	50.9	14.6	3,154	117
Flour Corn	1	22.6	20.9	48.0	19.3	3,552	122

CORN.—TABLE V.—Yield and Condition of Eleven Varieties for Three Years.

Yield in bushels of 70 lbs. ears per acre.

Varieties.	1888.			1889.			1890.			Average.		
	Yield per acre.	Days from planting to cutting.	Ripe or unripe.	Yield per acre.	Days from planting to cutting.	Ripe or unripe.	Yield per acre.	Days from planting to cutting.	Ripe or unripe.	Yield per acre.	Days from planting to cutting.	Ripe or unripe.
Large Yellow Dent.	*Bushels.*			*Bushels.*			*Bushels.*			*Bushels.*		
Chester Co. Mammoth..	110.5	126	Unripe	91.2	134	Unripe.	80.7	121	Unripe.	94.1	128	Unripe.
Cloud's Early Dent.....	98.0	126	"	94 6	131	Ripe.	72.9	123	Ripe.	88.5	126	Ripe.
Golden Beauty	91 8	129	"	82.6	134	Unripe	74.0	123	Unripe.	82.8	128	Unripe.
Improved Leaming	84 9	120	Ripe.	83.4	131	Ripe.	61.6	112	Ripe.	76.6	121	Ripe.
Leaming	67.1	126	"	90.7	132	"	65.1	112	"	76.6	123	"
Medium Yellow Dent.												
Clarage.....	91.4	121	Ripe.	69 0	124	Ripe.	55.1	112	Ripe.	71 8	119	Ripe.
Farmers' Favorite.....	87.7	126	Unripe.	90.7	134	"	77.9	123	Unripe	85.4	127	Unripe.
Queen of the Prairie.....	57.7	126	Ripe.	44.2	116	"	43.5	112	Ripe.	48.5	118	Ripe.
Large White Dent.												
Hess' White	82.8	122	Ripe.	83.3	131	Ripe.	64.2	123	Ripe.	76 8	125	Ripe.
Medium White Dent.												
Early White Dawn	62 5	94	Ripe.	57.8	134	Ripe.	54 4	112	Ripe.	58.2	113	Ripe.
Old Cabin Home	71.1	121	"	59.9	134	Unripe	57.6	123	Unripe	62.9	126	Unripe.

Table V, compiled from the results of 1888, 1889 and 1890, gives the yield of each year, the average yield for the three years, the number of days from planting to cutting each year, the average number of days from planting to cutting, and the ripe or unripe condition at cutting of such varieties as have been grown during these three years in succession. The table shows larger average yields in those varieties that failed to mature; this is as we might expect, i. e., the greener the corn the more water it contains, and consequently the greater the weight. The percentage of water in the corn must naturally vary with the kind of corn and the season. The early maturing varieties would be expected to contain a smaller percentage of water than medium maturing varieties, and these a smaller percentage again than those maturing late. Upon this point the bulletin of the Illinois Experiment Station, previously quoted, says:

"During the three years, the early maturing varieties have contained an average of 17.1 per cent. of water; the medium maturing, 26.4 per cent. (Thoroughly air-dry corn contains about 11 per cent. of water)"*

CORN.—TABLE VI.—SUMMARY OF TABLE V.

Class and variety.	Average yield as weighed in—		Shrinkage.
	November.	January.	
Large Yellow Dent.	*Bushels of 70 lbs.*	*Bushels of 68 lbs.*	*Per cent.*
Chester County Mammoth	94	75	20
Cloud's Early Dent	89	71	20
Golden Beauty	83	67	19
Improved Leaming	77	70	9
Leaming	77	67	12
Medium Yellow Dent.			
Clarage	72	66	8
Farmers' Favorite	85	66	22
Queen of the Prairie	48	47	2
Large White Dent.			
Hess' White	77	72	7
Medium White Dent.			
Early Dawn	58	53	9
Old Cabin Home	63	47	25

Comparing Table I of last year with Table I of this, I find the shrinkage much greater during the two months after husking last year than it

*Bulletin 13, Agricultural Experiment Station of the University of Illinois, February, 1891, p. 390.

was in the two months after husking in 1890. This points to the conclusion that 70 pounds at husking time is not always sufficient to make a bushel of dry corn, while sometimes it may be more than enough. Table V also brings out more clearly the fact that the Chester County Mammoth, Cloud's Early Dent, Golden Beauty, Farmers' Favorite and the Old Cabin Home varieties can not be relied upon to mature on our soil.

The lesson to be learned from Table V may perhaps be made clearer by Table VI, in which are given the average yields of each variety for the three-year period, both as weighed from the field in November, and as re-weighed in January, with the percentage of loss in drying.

This table shows strikingly how an apparently great yield may shrink to a moderate one through simple evaporation.

METEOROLOGICAL CONDITIONS.

The experiments of the past few years with corn indicate quite plainly that it is a crop very materially affected by meteorological conditions; it therefore seems that a report upon comparative tests should include the two most important conditions of the weather, namely: the temperature and rainfall. Tables VII and VIII give these data, not only for the months of April, May, June, July and August, 1890, but for the same months for a series of years.

CORN.—TABLE VII.—RAINFALL ON STATION FARM DURING THE FIVE MONTHS OF THE CORN SEASON FOR EIGHT YEARS.

Month.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	Average 8 years.
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
April.....	2.98	2.40	4.51	3.25	4.45	2.39	1.11	4.08	3.14
May.....	5.76	4.34	5.92	6.91	4.36	6.67	3.46	4.69	5.27
June.....	4.70	1.11	4.84	2.23	5.47	2.43	2.08	5.43	3.54
July.....	2.92	2.23	3.01	3.01	1.56	4.72	2.85	1.41	2.71
August.....	2.12	0.45	5.50	1.42	2.47	5.85	2.07	2.71	2.82
Total.....	18.48	10.53	23.78	16.82	18.31	22.06	11.57	18.32	17.48

CORN.—TABLE VIII.—MEAN TEMPERATURE AT THE STATION FOR THE FIVE MONTHS OF THE CORN SEASON FOR EIGHT YEARS.

Month.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	Average 8 years.
	Degrees	*Degrees*	*Degree*	*Degrees*	*Degrees*	*Degrees*	*Degrees*	*Degrees*	*Degrees.*
April.....	48.1	48.5	49.0	53.1	48.2	46.3	50.7	52.6	49.5
May	58.0	59.3	59.3	63.5	66.3	60 1	60.6	59.3	61.2
June	69.1	71.1	65.8	68 5	70.7	71.1	67.1	73.4	69.5
July	71.1	71.6	75.2	72.8	75.5	72 8	73.0	72.9	73.2
August	67.2	71.6	69.5	70.0	70.8	70 9	68 8	68.5	69 8

DESCRIPTIVE NOTES ON VARIETIES.

The following descriptive notes do not include all the varieties raised, but only such as are deemed worthy of space. The name in parenthesis, after the variety name in each case, indicates the seedsman from whom the seed was purchased. The Station does not attempt to furnish seed, except of one or two varieties, but the different kinds may be had by addressing the seedsmen indicated. The full names and addresses of most of these dealers can be found in almost any good agricultural paper.

LARGE YELLOW DENT.

1. *Big Buckeye* (Livingston). Ears of medium length, heavy at butt; twenty rows of kernels, quite regular; filling at tip of ear good; kernels yellow, deeply dented but smooth; cob red.

2. *Briar Crest Beauty* (Maule). Ears more than ordinarily long, and pretty uniform size from butt to tip, bearing twelve rows of very large-grained corn; rows straight and regular; tips of ears well filled; cob pale-red and of moderate size; kernels light-yellow and deeply dented.

3. *Chester County Mammoth* (Maule). Ears long and quite heavy at butt, but tapering rapidly to a well-filled point; sixteen rows of very compact, lightly dented, yellow kernels; cob light-red and of medium size.

4. *Cloud's Early Dent* (Dreer). Ears of medium length, very heavy at butt and tapering; well filled at tip; rows ordinarily regular, sixteen in number; kernels uniform, almost white; rather a large red cob, not very strong.

5. *Golden Beauty* (Livingston). Ears large, uniform in size, tapering slightly, well filled at point; rows regular; kernels very large, deeply dented, but even; red cob of medium size; fails to mature satisfactorily on Station grounds.

6. *Golden Dent* (Thorburn). Very similar to if not identical with Golden Beauty.

7. *Leaming* (Station). Ears large at butt, medium length, tapering to a small well-filled point; rows of kernels sixteen in number, with a tendency to run irregularly; corn very compact, on a medium-sized red cob.

8. *Leaming Improved* (Currie Bros.) It is well described in No. 7.

9. *Murdock's Yellow Dent* (University of Illinois). Ears medium size, about average length; rows of kernels running irregularly in some ears, in others perfectly straight; kernels very compact, on a red cob, which is well filled to the tip; grains but slightly dented; in general appearance this variety resembles the Leaming.

10. *Wooduorth's Yellow Dent* (Vaughan). Ears short but thick, and bearing sixteen rows of slightly dented yellow corn, compactly set upon a medium-sized red cob; in appearance the kernels are quite like the Leaming; this is one of the early maturing varieties.

MEDIUM YELLOW DENT.

11. *Clarage* (Station). Ears medium size, with irregular rows; kernels a deep yellow and plainly dented; small red cob, well filled from butt to tip; one of the earlier maturing varieties.

12. *Early Butler* (Ford & Son). This variety is very much like the Clarage, except that the ears are a little shorter in average length.

13. *Farmers' Favorite* (Maule). Ears quite long and of pretty uniform size; cob is inclined to be soft; kernels quite large, deeply dented and irregular; tips of ears well filled.

Edmund's Premium Dent (Leonard). Ears of medium length and thickness; kernels grow in regular, straight rows, and are a deep yellow with rough dents, making what is called a "hackberry" grain; a mean corn to husk; cob is small and red.

15. *King of the Earlies* (Ford & Son). Ears very short, grains deep yellow, small, deeply dented; an early maturing variety, but certainly not a valuable variety for a general field crop in this latitude.

16. *Mastodon* (Henderson). Ears of medium length, large at butt and tapering rapidly to a poorly filled tip; grains almost white, deeply dented and in very irregular rows; cob red.

17. *North Star Yellow Dent* (Vaughan). Ears of medium length, and solid, with a medium-sized cob; kernels are very much like the Leaming, having the same rounded appearance of butt.

18. *Pride of the North* (Leonard). Ears below medium size, otherwise the corn is quite like our Clarage of this same class.

20. *Queen of the North*, and 21, *Queen of the Prairie*, are in kind and quality quite like the Clarage.

22. *Ridey's Favorite Yellow* (Everitt). Ears above medium length, of regular and uniform thickness, bearing straight rows of deep yellow, smooth corn, but slightly dented; red cob, filled to the point.

23. *Wisconsin Yellow Dent* (Vaughan). Ears of medium length, bearing twenty rows of a rich yellow color; corn compactly set together on a red cob of regular and uniform thickness; rather a promising variety.

MIXED DENTS.

24. *Cranberry Dent* (Vaughan). Ears about medium length, nearly cylindrical, but a few of them tapering; filling at tip only medium; kernels of medium size; cob, white; grain a cranberry color, from which it takes its name.

25. *Butcher Corn* (Pinkham). Ears long and thick, carrying the thickness well from butt to tip; the kernels are what would be termed streaked, neither red nor white; large grain and a rather large red cob.

LARGE WHITE DENT.

26. *Champion Pearl White* (Maule). Ears of good size; white cob, with kernels in regular rows running well to the tip of the ear; kernels of regular size and slightly dented.

27. *Champion White Pearl* (Ford & Son). This corn is a bad mixture, and is not a well defined type of any kind.

28. *Hess' White* (Station). Ears long, almost cylindrical, but tapering near the tip; an occasional ear heavy at the butt, well filled at tip; rows straight and regular; kernels medium to large, clear white and broadly dented; cob, light-red.

29. *Iowa King* (Everitt). This is the largest eared variety of white corn grown at the Station in 1890. The grains are large, broadly dented and uniform in size, growing straight rows running well to the point of a large white cob. The grains are rather short and the cob above ordinary thickness.

30. *Mammoth White Dent* (Livingston). Ears above medium length, tapering but slightly from butt to tip; grains large, broadly dented and of regular size; cob purely white but not well filled at point.

31. *Mammoth White Surprise* (Henderson). This variety is a bad mixture and can not be true to name.

MEDIUM WHITE DENT.

32. *Maryland White Dent* (Hallock). Ears of medium length and above the ordinary in thickness; kernels irregular in size and having rough butts, making it hard on the hands to husk; cob, white but soft and not well filled.

33. *Early White Dawn* (Livingston). Ears above medium length; corn compactly set on the cob; grains broadly dented and of irregular size and shape; rows irregular; cob, red.

2. DISTRIBUTION OF SEED.

Table IX gives in detail the results of the experiment in 1890 of distributing the grains at varying distances. As usual, and as might be expected, we get large yields and a large percentage of green corn and nubbins where the stalks grow more closely together, and less corn but of better quality where the limits of distribution are extended. Plot No. 44 shows a large yield from close planting, also a great yield of fodder; but the percentage of ears or salable corn is only about one-third of the entire crop, which would reduce the market value of an acre of corn planted so close below that of a similar acre with the stalks growing at greater distances. As may be observed in the averages of the tables under consideration, the more valuable results would be obtained on the soil of this farm, where the seed was distributed at the rate of one grain every 12 inches; upon poorer soils it is possible that 15 inches apart would be a better distribution of stalks.

Table X gives averages from planting at different distances for three years, and indicates quite pointedly that the above conclusion is correct, namely: that more valuable results will be realized where the distribution of seed averages one grain to every 12 inches than where their average distribution is at greater or less distances.

CORN.—TABLE IX.—DISTRIBUTION OF SEED.

Yield per acre.—1 *bushel*=70 *lbs. ears.*

Plot No.	Distribution of seed.	Grain.		Stalks.	Per cent. of ears.	Per cent. of nubbins.
		Actual yield.	Corrected yield.			
		Bushels.	*Bushels.*	*Pounds.*	*Per cent*	*Per cent.*
38	1 grain every 9 inches.....	44 6	67.7	3,486	53	47
39	1 " 12 "	45 7	59.3	2,838	64	36
40	1 " 18 "	38.8	44.3	2,513	43	57
41	2 grains every 18 inches.....	50.3	69.9	4,468	51	49
42	2 " 24 "	48 5	62 8	3.142	64	36
43	2 " 36 "	43.4	49.4	2,298	78	22
44	3 " 18 "	76 7	128.8	6,114	35	65
45	3 " 27 "	47.2	62.1	3,872	45	55
46	3 " 36 "	53.9	62.1	3,726	64	36
47	3 " 45 "	48 3	54 9	2,628	72	28
48	4 " 36 "	55.0	68.2	4,194	48	52
49	4 " 48 "	49 7	60.8	3,370	66	34
50	3 " 45 "	51.3	58.6	2,921	73	27
51	1 grain every 15 "	52.5	55.7	2 388	70	30
52	2 grains every 30 "	52.3	59.8	3,762	72	28
	Averages.					
	Grains 9 inches apart.....	49.3	66.9	5,251	49	51
	" 12 "	49 4	61.2	3,194	64	36
	" 15 "	51 1	57.2	2 925	72	28
	" 18 "	41.1	46.9	2,408	60	40

CORN.—TABLE X.—AVERAGE YIELDS FOR THREE YEARS FROM DIFFERENT DISTRIBUTION OF SEED.

Distribution of seed.	Corrected yield.				Average per cent. of ears.	Average per cent. of nubbins.
	1888.	1889.	1890.	Average.		
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Per cent.*	*Per cent.*
Grains 6 inches apart.....	96.7	107.2	.....	101.9	53	47
" 12 "	97.4	80.6	61.2	79.7	77	23
" 15 "	68.2	69.4	57.2	64.9	81	19
" 18 "	78.9	61.4	46.9	62.4	77	23

3. SEED FROM DIFFERENT PARTS OF THE EAR.

It should be borne in mind that the seed used in this experiment has been grown continuously from the several parts of the ear, each year preserving the seed from the tips of ears grown from planting tips the

year previous, middles from middles and butts from butts, in like manner, for three consecutive seasons. Our results previous to 1890 have shown no marked differences. Last year, three plots of each were planted, with the hope of getting some more definite or varied results; but on account of some irregularities in growth it was thought best to discard four of the plots, leaving us but a single plot grown from tips, and but one duplicate of each of the others. Table XI shows more than an ordinary amount of irregularity in these. The averages shown in the same table indicate varying results from seed from different parts of the ear, such as have not been indicated by any former experiment, except that of 1886. In general the averages show more corn of a better quality from the seed from the butts of ears than from the tips or middles. The results from middles indicate less corn with a larger per cent. of nubbins and more barren stalks than from seed from other parts of the ear. This, however, is not conclusive; more evidence is necessary to prove the indications. Table XII gives the averages of these experiments for four years, also the total averages for the same. The final summing up shows that the variation in yield is not great, but the figures do not show that the kernels from the middles of an ear of corn are any better for seed purposes than are those from the butt or tip. The difference between butts and tips is likewise slight, the butts having the advantage.

CORN.—TABLE XI.—SEED FROM DIFFERENT PARTS OF THE EAR.

Yield per acre corrected to a full stand.

Plot No.	Seed from—	Barren stalks.	Grain.			Stalks.
			Total.	Per cent. of ears.	Per cent. of nubbins	
			Bushels.	*Per cent.*	*Per cent.*	*Pounds.*
53	Butts	49	57.8	68	32	2,804
54	Middles	98	49.8	53	47	2,981
55	Tips	81	51.6	57	43	3,285
56	Butts	117	48 1	51	49	3,007
57	Middles	129	41.0	34	66	2,588
	Averages.					
	Butts	83	52 9	59	41	2,905
	Middles	113	45 4	43	57	2,784
	Tips	81	51 6	57	43	3,285

CORN.—TABLE XII.—SEED FROM DIFFERENT PARTS OF THE EAR.

Summary of four years' experiment.

Year.	Seed from—	Yield per acre.	Per cent. of ears.	Per cent. of nubbins.
		Bushels.	*Per cent.*	*Per cent.*
1888	Butts	57 7	67	33
	Middles	48 1	84	16
	Tips	53 6	88	12
1889	Butts	80 2	82	18
	Middles	80 8	83	17
	Tips	76.5	81	19
1890	Butts	77.1	86	14
	Middles	77 0	91	9
	Tips	77.7	89	11
1890	Butts	52 9	59	41
	Middles	45.4	43	57
	Tips	51.6	57	43
Average	Butts	66 9	74	26
	Middles	62 8	75	25
	Tips	64 8	79	21

4. METHODS OF CULTIVATION.

During the seasons of 1888 and 1889 I conducted an experiment in deep and shallow tillage of corn, using for the deep cultivation an ordinary one-horse double shovel, the frequent use of which implement kept the ground pretty thoroughly stirred to a depth of at least four inches. For the more shallow cultivation a one-horse cultivator was used, which kept the ground stirred about two inches deep. The results as calculated showed a slight advantage in favor of the deeper cultivation. In 1890, instead of the cultivator, we used a small one-horse harrow for the surface cultivation, and out of thirteen plots six were tilled with the harrow and seven with the double shovel. The results are given in Table XIII. The ground was not in good condition when plowed, and remained in a very unsatisfactory state during the season, working up cloddy. This probably accounts for the wide disparity in yield of the individual plots. Taking the total averages, we have more corn and less fodder from the more shallow cultivation.

CORN.—TABLE XIII.—METHODS OF CULTIVATION.

Corrected to full stand—1 bushel = 70 lbs. ears.

Plot No.	Deep or shallow.	Yield per acre.	
		Grain.	Stalks.
		Bushels.	*Pounds.*
1	Deep—Double shovel	50.4	3,617
2	Shallow—Harrow	39 7	3,345
3	Deep—Double shovel	35.4	3,260
4	Shallow—Harrow	40.9	3,329
5	Deep—Double shovel	43.4	3,791
6	Shallow—Harrow	44.8	3,270
7	Deep—Double shovel	37.6	3,070
8	Shallow—Harrow	54 6	2,622
9	Deep—Double shovel	54.0	2,923
10	Shallow—Harrow	48.4	2,792
11	Deep—Double shovel	51.1	2,405
12	Shallow—Harrow	54 3	2,337
13	Deep—Double shovel	46 6	2,716
	Averages—Deep	45 5	3,112
	Shallow	47.1	2,949

5. METHODS OF HARVESTING.

During the fall of 1889 I selected three-tenths of an acre of standing corn, which was quite uniform in stand and in general appearance. It was divided into three equal parts; one part was cut and shocked in the ordinary way and at the ordinary season; a second part was topped, while the third remained untouched to mature upon the stalk. The corn was all harvested at the same time, with the following actual yields: the standing corn produced at the rate of 80 bushels to the acre; topped corn at the rate of 75 9 bushels, while the shocked corn produced but 65.1 bushels.

These results were so striking that I attempted the experiment upon a larger scale this year. Instead of a single plot, three of each were harvested, with results as given in Table XIV, the averages of which do not confirm the work of 1889, but reverse the results, and show larger yields from cutting and shocking than from allowing the grain to mature on the stalk.

Not being satisfied with the results that we might secure at the Station, I wrote to some thirty persons, in as many different counties of the State, and requested them to carry out such an experiment in harvesting their general crop. Some replied that they were cutting up their corn to sow the ground to wheat; some said their corn was too irregular to get satisfactory results; others had no means of weighing yields; so that out of thirty but three individuals undertook the experiment. These were J.

W. Everal of Westerville, Franklin county, Eugene F. Cranze of Ira, Summit county, and D. H. Wilder of North Bloomfield, Trumbull county. To these gentlemen credit is due for the careful manner in which they have done the work, the results of which will be found in Table XV.

The yields as returned by Mr. Cranze and Mr. Wilder in Table XV are in direct opposition to those of Mr. Everal in the same table, and contrary to the Station's results of this year, but agree with our results of 1889. This indicates that the variation in yields may be due to the stage of maturity at which the corn is cut. It may be further observed that the two sets of results that agree for this year were upon similar soils. Those of Mr. Everal and the Station were obtained from corn grown upon a rich alluvial soil, while those of Mr. Cranze and Mr. Wilder were obtained from corn grown upon clay soils.

In Table XVI, I have given the value of the corn per acre, as obtained by the different methods, giving the cost of harvesting an acre, whether in shock or on the stalk. According to Mr. Wilder's results, the corn left to mature on the stalk is worth $6.69 more per acre than where it is cut and put into shock; allowing $3.50 per acre for the fodder still leaves $3.19 per acre in favor of allowing the corn to mature on the stalk. The results given by Mr. Cranze show an advantage in favor of maturing on the stalk of $3.43 per acre, but allowing $3 50 for the fodder in this case, the final result is seven cents in favor of shocking the corn. Making my calculations upon the same plan, I find that in the work of Mr. Everal and that of the Station I have $3.66 in favor of shocking corn in the first case and $4.00 in the latter. That is to say, after all expenses of cutting and tying, and the difference in cost of husking have been deducted, we have in the two cases under consideration $3.66 and $4.00 of clear gain per acre; while in the first two instances we would have a loss of $3.19 in the one from cutting, and a gain of seven cents per acre in the other. This experiment has brought out two points of interest, namely: a striking illustration of how we may be deceived by a single experiment, and that the question of the stage of maturity at which corn should be cut is worthy of careful investigation.

The value of the fodder in Table XVI was made the same in each case for the purpose of fairness in making calculations, and is simply an arbitrary value. The cost of harvesting is given as estimated by the individual experimenters, while the value of the corn is placed at market price.

It will be noticed that the yield of the topped corn is in every case lower than that of the standing corn of the nearest plot.

It will be observed that no estimate has been made on the pasturage value of the standing fodder. It is the opinion of many good farmers that

this value is often more than offset by the injury to the soil done by the trampling of stock while pasturing the stalks.

CORN.—TABLE XIV.—CURING BY CUTTING, BY TOPPING AND BY LEAVING UNCUT CONTRASTED.

Yield in bushels of 70 lbs. ears per acre.

Plot No.	Method of harvesting.	Grain.	
		Actual.	Corrected.
		Bushels.	*Bushels.*
1	Standing corn	54.1	64.2
2	Shocked corn	58 0	64 4
3	Topped corn	48.0	58.2
4	Standing corn	58.6	58.6
5	Shocked corn	62.0	62.9
6	Topped corn	64.7	64.7
7	Standing corn	70.8	70.8
8	Shocked corn	73.0	90 6
9	Topped corn	67.9	73.0
	Average standing	61.2	64.5
	" shocked	64.3	72.6
	" topped	60.2	65.3
	1889—Standing corn	80.0	....
	Shocked corn	65.1	....
	Topped corn	75.9	. ...

CORN.—TABLE XV.—CURING BY CUTTING, BY TOPPING AND BY LEAVING UNCUT CONTRASTED. CO-OPERATIVE TESTS.

Yield in bushels of 70 lbs. per acre.

Plot No.	Experimenter.	Method of harvesting.	Actual yield.
			Bushels.
1	J. W. Everal	Standing	67.5
2	"	Shocked	69.3
3	"	Topped	61.7
	Eugene F. Cranze	Standing	53.9
	"	Shocked	47.6
	"	Topped	51.1
	D. H. Wilder	Standing	62.3
	"	Shocked	49 1
	"	Topped	54.1

CORN.—TABLE XVI.—VALUE OF CORN AND FODDER, AND COST OF HARVESTING, BY THE DIFFERENT METHODS.

Experimenter.	Method of harvesting.	Value.		Cost of husking.	Balance in favor of—
		Grain at 50c per bushel.	Fodder harvested.		
D. H. Wilder	Standing	$31 15		$1 87	$3 19
"	Shocked	24 55	$3 50	1 96	
Eugene F. Cranze	Standing	26 95		1 62	
"	Shocked	23 80	3 50	1 90	07
J. W. Eveial	Standing	33 75		2 03	
"	Shocked	34 65	3 50	2 77	3 66
Station	Standing	30 60		2 35	
"	Shocked	32 15	3 50	3 40	4 00

6. VARIETIES OF ENSILAGE CORN.

During the seasons of 1888 and 1889, experiments were conducted with different varieties of ensilage corn on good, rich land, the object being to gather some information as to their relative values as measured by their total product, percentage of grain produced, and length of time required to mature. In the spring of 1890 a piece of thin land was used for the same experiment, and at the same time a duplicate planting was made upon the same productive land upon which the experiment of the two previous seasons had been conducted. The intention was to compare the results from these two pieces of land, but before the corn was cut, back-water from the river so sanded the piece on good ground that it was not fit to use for silo purposes, hence the comparison of weights was not made except in a general way. The actual weights from the poorer piece of land were taken, and are given in Table XVII. Some weights taken from the other piece indicated nearly the same rate per acre as in the previous year, hence I have inserted the weights of 1889, not for a close comparison but simply as indicating possible differences on soils of varying fertility.

In neither year were the varieties of corn sufficiently matured to make first class ensilage, except the Early Sanford; and this variety is not sufficiently productive to justify its general introduction for ensilage purposes. In 1889 the corn was planted on the 19th of June and cut on the 27th of September. In 1890 it was planted on the 7th of June, nearly two weeks earlier than in 1889, and cut on the 27th of September. The results justify the opinion that corn for ensilage purposes should be planted as early as, if not earlier than ordinary field corn.

The question is so frequently asked, "How much corn is required to drill an acre for ensilage purposes?" that it seems proper to say here that it will vary somewhat with the variety of corn used, and also according to the quality of the land upon which it is planted; because strength of soil should be considered in determining how close to put the grains, and the size of grain must be considered when we say how much by measure or by weight, because some varieties of ensilage corn have grains almost twice as large as others. I have used of Red Cob Ensilage corn forty-one pounds to the acre; this has made it thick enough to pull out about one-eighth. The calculation can be easily made by counting the number of grains in a pint, from which the number in a bushel can be estimated. The number of stalks upon an acre should not in any case exceed 23,200; in most cases about 18,000 would be a better distribution.

CORN.—TABLE XVII.—YIELD OF VARIETIES GROWN FOR ENSILAGE.

Variety.	Tons per acre, 1889.	Tons per acre, 1890.	Ripe or unripe.	Per cent. bearing ears.
B. and W	15.5	6.5	Unripe	100
Sheeptooth		6.0	"	100
Blount's White Prolific	17.3	3.5	"	100
Red Cob Ensilage	18.6	5.8	"	100
Breck's Boslow Market	19.4	6.2	"	100
Early Sanford	12.5	2.4	Ripe	100
Sweet Fodder Corn	15.0	2.1	"	90
Thoroughbred Flint	21.2	5.7	Unripe	100
Virginia Horsetooth	26.0	7.4	"	100

7. FERTILIZERS ON CORN.

FIELD EXPERIMENTS AT THE STATION.

These experiments were begun in 1888, and the following report covers the third season's work with corn. The experiments with fertilizers are conducted conjointly by the Director and Agriculturist of the Station.

The following statement of the general plan of the experiments is republished from the Bulletin of this Station for February, 1890:

Five sections of land have been laid out and subdivided into plots of one-tenth and one-twentieth acre each. Four of these sections are to be devoted to continuous cropping with corn, oats, wheat and potatoes, respectively, and the fifth is to be cultivated in rotative cropping. The general arrangement of these sections is shown in Diagram II. In Diagram III is shown the plan under which each of the sections devoted to corn, oats and wheat is subdivided into plots and fertilized. Each plot is 16 feet wide by 272½ feet long, and contains one-tenth acre. The plots are separated by alley-ways two feet wide. Under every alternate alley-way a tile drain is laid, thus giving a drain on one side or the other of each plot. These drains are indicated by dotted lines in the diagram. Every third plot is left unfertilized, so that each fertilized plot has an unfertilized one on one side or the other, for comparison. In addition to the under-drains, the plots are plowed into low ridges, leaving furrows in the alley-ways, in order that surface washing may not convey fertility from one plot to another, and that water may not stand on any portion of the land under experiment.

DIAGRAM II.—FIELD EXPERIMENTS WITH FERTILIZERS.

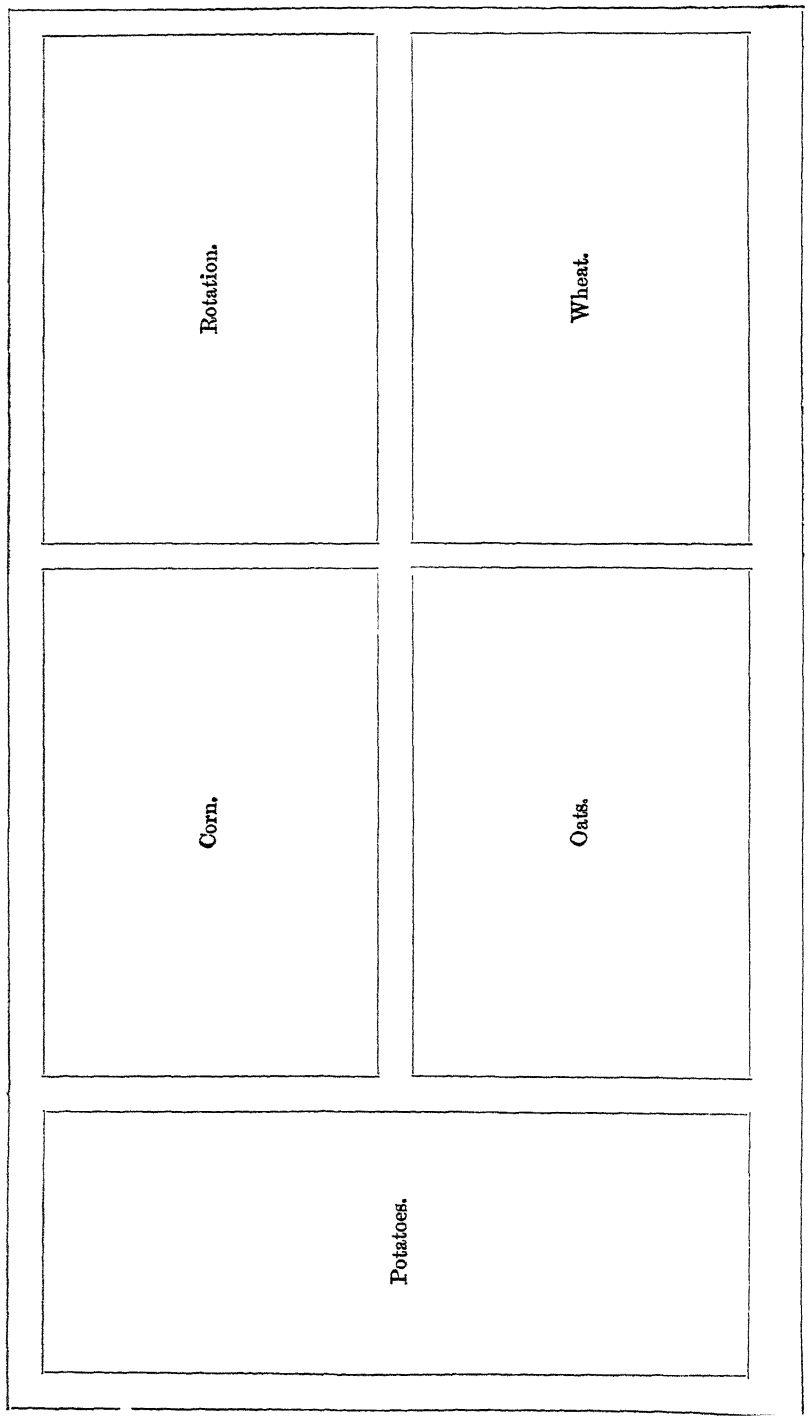
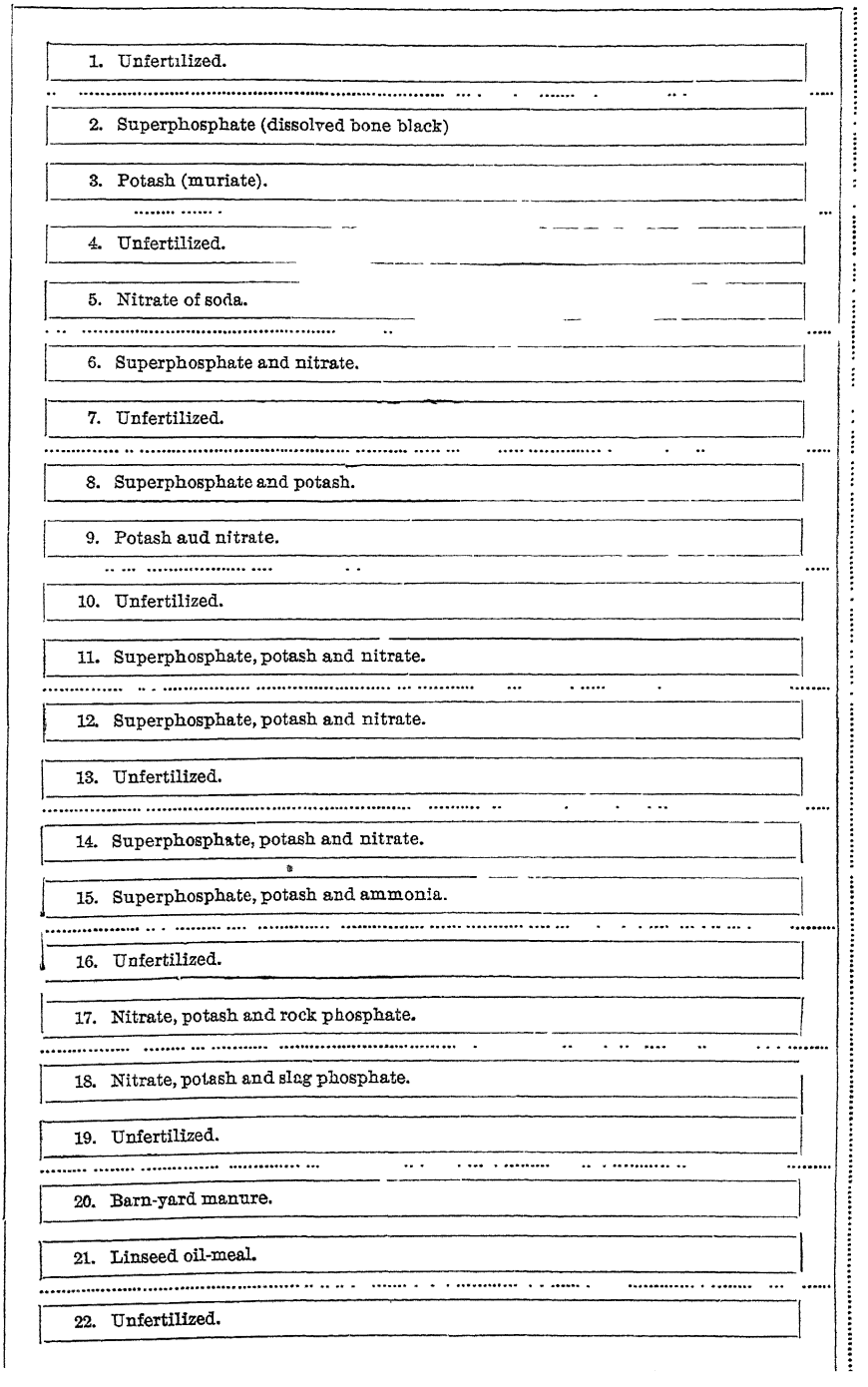


DIAGRAM III—FIELD EXPERIMENTS WITH FERTILIZERS.



On the first eleven plots of the sections devoted to corn, oats and wheat, the three most essential elements of fertility, phosphoric acid, potash and nitrogen, are used, first singly, then in pairs, and lastly in combination of all, the object being to ascertain whether either of them may be omitted from a fertilizer for this soil.

On plot 12 nitrogen is used in double the quantity, and on plot 14 in three times the quantity used on plot 11, the object being to ascertain the most effective proportion of nitrogen to phosphoric acid and potash.

On plot 15 sulphate of ammonia is used as the source of nitrogen, in order to contrast ammonia-nitrogen with that of nitrates.

On plot 17, South Carolina phosphatic rock is used as the source of phosphoric acid, instead of dissolved bone-black; and on plot 18, the phosphatic fertilizer now made by grinding the slag resulting from steel manufacture by the Thomas-Gilchrist process is used. (It is intended to apply the same quantity of phosphoric acid in these materials as is contained in the 320 pounds dissolved bone-black used; but, owing to an error in computations, this was not accomplished in the experiments of 1889.)

On plot 20 it is intended to use barn yard manure containing approximately the same quantity of nitrogen as that used on plot 14.

The rate of application of oil-meal on plot 21 was fixed at 1,800 pounds in order to compare the results with a similar application made at Rothamsted, but in future the oil-meal will be reduced to a quantity sufficient to furnish the same amount of nitrogen as that applied to plot 12, and the phosphoric acid will be brought up to the same rate by the addition of Carolina rock or Thomas slag.

The changes in the apportionment of nitrate of soda to plots 5, 6, 9, 11, etc., have been made to bring the work into conformity with plans adopted by a convention of field experimenters, held at Washington, D. C., March 5 and 6, 1889.

Table XVIII shows the arrangement of plots, with distribution of fertilizers and other data.

The land on which this experiment is being made lies in the valley of the Olentangy, one of the largest branches of the Scioto. The rock underlying the soil is Huron shale, which, judging from diggings made in the neighborhood, will be found at an average depth of fifteen to twenty feet. On this rocky floor, through the combined action of drift and alluvial agencies, the materials have been deposited from which the soil has been derived. These materials are of various origin, consisting of sand, gravel, boulders and clay. The gravel is chiefly limestone, but contains a considerable proportion of rounded fragments of black shale; the boulders are chiefly the granitic rocks that constantly accompany the drift in Ohio, together with an occasional limestone; the clay is the ordinary boulder-clay of this drift, with a considerable admixture of fragments of shale. This frequent occurrence of shale in the soil and gravel shows that the Huron shale, whose line of outcrop follows approximately the line of glacial erosion through this part of the State, has been one of the chief sources of the soil of this field.

Under the section devoted to oats and corn, gravel is found at a depth of three to five feet, and this portion of the field would not have required under drainage in ordinary farm practice. There were portions, however, in which the drainage was less perfect than in others, and it was thought best to drain the whole, in order to make the conditions, both of drainage and aeration, as uniform as possible. The gravel is not found under the sections devoted to wheat and rotation; on the contrary, there exists here a very retentive subsoil, the "boulder-clay" of the drift, and in wet seasons crops have suffered much from lack of drainage. The Huron shale weathers quickly into a heavy clay, which has been found to be rich in potash, and appreciable quantities of gypsum are found in the clay, due probably to a combination of pyrites and lime, both of which are found both in the shale and in the gravel of the drift. It would be expected that a soil of such origin would not be deficient in available potash, and such seems to be the case with this soil. In fact, it is a soil of great natural fertility. When properly drained and well tilled, it yields abundant crops, and for this reason a test of fertilizers

must be less satisfactory here, in some respects, than it might be on a soil of a different nature.

FERTILIZERS ON CORN.—TABLE XVIII.—QUANTITY AND COST PER ACRE.

Plot No.	Fertilizers.	Quantity.	Essential ingredients.			Cost.
			Nitrogen.	Phos acid.	Potash.	
		Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	
1	Unfertilized					
2	Superphosphate[1]	320		50		$4 30
3	Muriate of Potash	160			80	3 60
4	Unfertilized					
5	Nitrate of Soda	160[2]	25[2]			3 80
6	Nitrate of Soda Superphosphate	160[2] 320	25[2]	50		8 10
7	Unfertilized					
8	Superphosphate Muriate of Potash	320 160		50	80	7 90
9	Nitrate of Soda Muriate of Potash	160[2] 160	25[2]		80	7 40
10	Unfertilized					
11	Superphosphate Muriate of Potash Nitrate of Soda	320 160 160[2]	25[2]	50	80	11 70
12	Superphosphate Muriate of Potash Nitrate of Soda	320 160 320	50	50	80	15 50
13	Unfertilized					
14	Superphosphate Muriate of Potash Nitrate of Soda	320 160 480[3]	75[3]	50	80	19 30
15	Superphosphate Muriate of Potash Sulphate of Ammonia	320 160 120	25	50	80	12 10
16	Unfertilized					
17	Dissolved S. C. Rock Muriate of Potash Nitrate of Soda	300 160 160[2]	25[2]	45	80	10 40
18	Thomas Slag (ground) Muriate of Potash Nitrate of Soda	400 160 160[2]	25[2]	78	80	10 60
19	Unfertilized					
20	Barnyard manure	8 tons.	75	25	50	
21	Linseed oil-meal	1,800	90	38	25	18 00
22	Unfertilized					

[1] Dissolved bone black.
[2] 480 and 75 pounds in 1888.
[3] 160 and 25 pounds in 1888.

There are, however, two questions which we may ask this soil, for the answering of one of which, at least, its natural fertility will be an advantage, and for the other no disadvantage. These are:

1. How can we most economically maintain the fertility of our soil?
2. To what limit may we profitably increase the fertility of a good soil?

It was with a full realization of the character of this soil and the consequent difficulty of drawing from it an answer to all the questions on which it would be desirable to have information, that this work was undertaken, and therefore, simultaneously with the starting of this series of experiments on this soil, preparations were begun to institute similar investigations on other and less fertile soils in different parts of the State. The progress of this work will be reported further on.

Of the previous treatment of this field we have no record, prior to 1877. Since that date the cropping has been as follows: 1877, wheat; 1878, 1879, 1880, timothy; 1881, 1882, corn; 1883, 1884, wheat; 1885, 1886, 1887, clover. It was dressed with barnyard manure in the spring of 1881, the manure being plowed under; it was top dressed in the fall of 1883 for the wheat crop following. In the spring of 1888 the field was drained and corn was planted on the section devoted to that crop. On the section devoted to oats, millet was grown in 1888, it being too late to sow oats after the drainage was completed. The section devoted to wheat lay idle until fall. A considerable growth of volunteer clover sprang up, which was plowed under in preparing the land for wheat.

Table XIX gives the rates of yield for 1889 and 1890 of the plots devoted to corn, the yields being calculated to full stand. In 1888, the crop contained more than an ordinary proportion of water when harvested, owing to the extremely wet season. For this reason, samples containing 100 pounds of ears were taken from each plot and placed in open barrels, so arranged that the air could have free access, and allowed to stand until January, when they were weighed again. A table showing the shrinkage in weight for part of these samples is given in the Annual Report of this Station for 1888, page 94. Owing to a mistake in weighing, the shrinkage of samples from plots 12 to 22, inclusive, was not determined; but the weights given show that there was no connection between the variations in weight and the variations in treatment of the plots. The average shrinkage was about 17 per cent. of the original weight—or approximately one-sixth.

In harvesting the crops of 1889 and 1890, similar samples of 100 pounds each were taken from the plots, which were dried until January, and then weighed again as before. The shrinkage in these cases was much smaller than before, averaging about 6 per cent. in 1889 and 7 per cent. in 1890; but no connection whatever has yet been found between the variations in shrinkage in drying and in treatment of the plots, and therefore the yield and rate of increase, given in Table XIX, have been computed on the basis of the November weights.

FERTILIZERS ON CORN.—TABLE XIX.—EXPERIMENTS AT THE STATION.

Yield per acre, corrected to full stand.—1 bushel=70 lbs. ears.

Plot No.	Fertilizers.	Yield.		Increase.*	
		1889.	1890.	1889.	1890.
		Bushels	*Bushels.*	*Bushels.*	*Bushels.*
1	Unfertilized	64.6	51.3		
2	Superphosphate (dissolved bone-black)	65.0	49.4		
3	Potash (muriate)	60.0	50.3		
4	Unfertilized	68.3	51.6		
5	Nitrate of soda	67.7	50.4	2.4	1.3
6	Nitrate and superphosphate	68.9	50.3	5.6	3.7
7	Unfertilized	59.3	44.1		
8	Superphosphate and potash	63.7	48.4	3.8	3.2
9	Nitrate and potash	67.6	53.9	7.1	7.6
10	Unfertilized	61.1	47.4		
11	Superphosphate, potash and nitrate, 160	71.1	50.5	7.8	2.9
12	" " " 320	63.9	54.1		6.2
13	Unfertilized	67.7	48.1		
14	Superphosphate, potash and nitrate, 480	61.4	50.3		3.7
15	" " ammonia	57.4	45.7		0.6
16	Unfertilized	56.7	43.6		
17	Rock phosphate, potash and nitrate	57.3	47.8	1.0	5.4
18	Slag phosphate, potash and nitrate	61.0	47.5	5.2	6.5
19	Unfertilized	55.4	39.9		
20	Barnyard manure	66.4	45.1	9.0	2.9
21	Linseed oil-meal	72.6	46.2	13.3	1.6
22	Unfertilized	61.3	47.0		
	Average of unfertilized plots	61.8	46.6		

*In computing the increase of the fertilized plots, in this and subsequent tables, each fertilized plot is compared with the unfertilized plots between which it lies, on the following plan: Suppose that plots 1 and 4, unfertilized, have yielded 40 bushels and 43 bushels respectively, it is assumed that plot 2 would have produced 41 bushels, and plot 3, 42 bushels without any fertilizer. In calculating the probable unassisted yield of any fertilized plot, therefore, the yield of the unfertilized plot nearest it has been multiplied by two, that of the plot farthest away added to the product, and the total sum divided by three.

The season of 1890 was peculiarly unfavorable to corn, the almost incessant rains of spring and early summer interfering seriously with planting and cultivation, after which a severe drouth retarded growth. The average corn crop of Ohio for 1890 will probably be found to have been one of the smallest on record, when its statistics are collected.

While the increase apparently due to the fertilizers has been somewhat more uniform in 1890 than in 1889, it is still insufficient, in every case, to pay for the fertilizer, nor is it sufficiently regular to furnish any reliable indication as to which combination of fertilizing elements is best adapted to the needs of the corn plant on this soil.

CO-OPERATIVE TESTS BY FARMERS.

The plan of these tests is somewhat less elaborate than that of the tests conducted at the Station, no comparison being attempted between different quantities or kinds of nitrogen and phosphoric acid. Nitrate of soda is used in all cases at the rate of 160 pounds per acre, dissolved bone-black at the rate of 320 pounds, and muriate of potash at the rate of 160 pounds. Thirteen or more plots are used in these tests, arranged as in Diagram IV.

FERTILIZERS ON CORN.—DIAGRAM IV.—ARRANGEMENT OF PLOTS IN CO-OPERATIVE TESTS.

1. Unfertilized.
2. Superphosphate (dissolved bone-black.)
3. Muriate of potash.
4. Unfertilized.
5. Nitrate soda.
6. Nitrate of soda and bone-black.
7. Unfertilized.
8. Superphosphate and potash.
9. Nitrate and potash.
10. Unfertilized.
11. Superphosphate, potash and nitrate.
12. Barnyard manure.
13. Unfertilized.
14. Land plaster.

FARM TEST IN COLUMBIANA COUNTY, BY H. Y. BENTLEY.

The first of these tests was located in Columbiana county, the experiment having been commenced in 1888, and the report of the first season's test was given in the annual report of this Station for that year. In that

report the location of the test is described as a high "soap-stone" or slaty point, the soil being about ten feet of decomposed slate, resting upon slate rock, which gives natural drainage. The soil is quite loose, and always easily worked, but lacking in natural fertility. The following table gives the results for 1889 and 1890, in comparison.

FERTILIZERS ON CORN.—TABLE XX.—EXPERIMENTS ON CORN IN COLUMBIANA COUNTY, BY H. Y. BENTLEY.

Yield per acre, corrected to full stand—1 bushel =70 lbs. ears.

Plot No.	Fertilizers.	Yield.		Increase.	
		1889.	1890.	1889.	1890.
		Bushels.	*Bushels.*	*Bushels.*	*Bushels.*
1	Unfertilized	53.5	20.4	.....	.....
2	Superphosphate (dissolved bone-black)	55.9	18.3	0.9	.....
3	Potash (muriate)	56.3	19.7	.....	.....
4	Unfertilized	58.1	21.8	.....	.....
5	Nitrate of soda	58.4	30.2	.....	8.1
6	Nitrate and superphosphate	62.6	30.2	.....	7.5
7	Unfertilized	65.7	22.8	.....	.....
8	Superphosphate and potash	62.8	15.0	.....	.....
9	Nitrate and potash	67.2	31.7	3.8	8.4
10	Unfertilized	62.2	23.5	.....	.....
11	Superphosphate, potash and nitrate	66.0	24.7	5.3	1.2
12	Barnyard manure	74.0	30.6	14.7	7.0
13	Unfertilized	57.8	23.6	.....	.....
14	Land plaster	60.0	20.6	2.2	.....
	Average of unfertilized plots	59.5	22.4	.....	.....

Notwithstanding the low average yield of the unfertilized plots, the increase due to the fertilizers is in every case too small to pay the cost of the fertilizer, except on plot 5, and here it is probable that a part of the indicated increase is due to natural inequalities of soil.

FARM TEST IN LICKING COUNTY, BY LEVI KNOWLTON.

Table XXI gives the results of a test made by Mr. Levi Knowlton, of Utica, Licking county. This is the second test made by Mr. Knowlton, but the two tests have not followed each other in the same location, as in the case of the tests at the Station and in Columbiana county. The soil is described as a run-down clay, which had been in clover in 1889, but was not mowed, being liberally mixed with plantain. All was plowed under about May 15.

FERTILIZERS ON CORN.—TABLE XXI.—EXPERIMENTS ON CORN IN LICKING COUNTY, BY LEVI KNOWLTON.

Yield per acre as weighed in the field—1 bushel=70 lbs. ears.

Plot No.	Fertilizers.	Yield.	Increase.
		Bushels.	*Bushels.*
1	Unfertilized	43.3	
2	Superphosphate (dissolved bone-black)	34.4	
3	Potash (muriate)	22.4	
4	Unfertilized	31.1	
5	Nitrate of soda	40.3	7.6
6	" and superphosphate	40.3	6.0
7	Unfertilized	35.9	
8	Superphosphate and potash	49.7	14.5
9	" " nitrate	37.0	2.4
10	Unfertilized	33.9	
11	Superphosphate, potash and nitrate	36.0	5.8
12	Barnyard manure	34.6	8.2
13	Unfertilized	22.7	
14	Land plaster	24.1	
15	Sulphate of ammonia	25.1	
16	Unfertilized	29 6	
17	Sulphate of potash	31.7	2.7
18	Fertilizing salt	31.3	2.8
19	Sulphate of ammonia and potash	24 6	
20	Unfertilized	27.4	
	Average of unfertilized plots	32.0	

Respecting this experiment, Mr. Knowlton writes:

The plots are laid out two rods by eight on land that slopes gently to the west, lengthwise of the plots. There was no standing water, but the land was rather moist, both when broken and during cultivation. All were planted and cultivated alike. Running lengthwise on and nearly between plots 2 and 3 is a strip of rather wet land that is blackish, and is perhaps ten or twelve inches lower at the west end than plots 1 and 4. On this black land, comprising six or eight square rods, the water rose in the horses' tracks at planting time, and the crop was much poorer than elsewhere.

There was no perceptible difference in the soil of plots 15 and 16, but plot 16, unfertilized, yielded thirty-five pounds more sound corn and four pounds less unsound than plot 15, which seems to indicate that sulphate of ammonia is an injury to the corn crop. There was a larger proportion of unsound corn on this plot than on any other.

To the eye, the soil is the same in plots 8 and 9; but eight gave a fourth more corn and nearly a fourth more fodder. Eight had phosphoric acid while nine had none. Two had the same amount of phosphoric acid, but the ground was wet. Six had the same, but was a little more gravelly, and the soil was apparently thinner. I think it inferable that this soil lacks phosphoric acid.

All the fertilizers were applied broadcast a day or two before planting. The crop was weighed November 26, and the corn and fodder were quite dry.

Table XXII gives the results of a test made by W. B. Hall, of Wakeman, Huron county, this being the second test made by Mr. Hall on the same spot. Mr. Hall describes his soil as follows:

The soil, previous to its use in this experiment, was badly run out, but is naturally a good soil. It is a clayey loam, with a stiff, hard subsoil underneath. It has also a large percentage of gravel intermixed, as does most of the glacial drift of northern Ohio. The drainage is naturally good, as the land is slightly descending in three directions, with a greater slope to the north and west. The crops previous to the experiment of last year were timothy, from which several crops had been taken, and previous to that the usual routine of corn, oats, wheat and grass. It has never been used as a pasture, to my knowledge, but has always been severely cropped, the crop being taken off and nothing returned to the soil.

FERTILIZERS ON CORN.—TABLE XXII.—EXPERIMENTS ON CORN IN HURON COUNTY, BY W. B. HALL.

Corrected yield per acre—1 bushel=70 lbs. ears.

Plot No.	Fertilizers.	Yield.		Increase.	
		1889.	1890.	1889.	1890.
		Bushels.	*Bushels.*	*Bushels.*	*Bushels.*
1	Unfertilized	12.6	27.4		
2	Superphosphate (dissolved bone-black)	33.8	35.1	20.4	9.1
3	Potash (muriate)	19.7	26.9	5.4	2.4
4	Unfertilized	15.1	23.1		
5	Nitrate of soda	18.6	24.3		
6	Nitrate and superphosphate	33.5	37.2	9.7	9.0
7	Unfertilized	28.2	30.7		
8	Superphosphate and potash	42.8	39.7	16.1	9.4
9	" " nitrate	33.6	41.8	8.3	11.9
10	Unfertilized	23 8	29.5		
11	Superphosphate, potash and nitrate	33.3	34.2	11.5	10.4
12	Barnyard manure	37.7	44.4	18.0	26.4
13	Unfertilized	17.7	12.3		
14	Land plaster	27.3	14 3	9.6	2.0
	Average of unfertilized plots	19.5	24.6		

It would seem that some of the cheaper forms of phosphoric acid might be used with some profit in growing corn on this soil. Nitrogen and potash seem to be of little service.

The figures showing the increase indicated in the previous tables are grouped together in Table XXIII, in order to give a more comprehensive view of the general outcome. This table also includes a column showing the average increase found in the four series of experiments during the two seasons. This average must be used with caution, however, as the data are not yet sufficient for the formulation of definite conclusions.

One point is brought out clearly in this summary, and that is that the line showing the increase from barnyard manure is the only one in which there are no blanks.

Valuing corn at an average of 33⅓ cents a bushel, it will be seen that the increase has not been sufficient to pay the cost of the fertilizer in any of the tests of 1890, nor in the average of the two seasons.

FERTILIZERS ON CORN.—TABLE XXIII.—Summary of Experiments on Corn.

Increase per acre in bushels of 70 lbs. ears.

Fertilizer.	Station.		Columbiana county.		Licking county.		Huron county.		Average.	Cost of fertilizer.
	1889.	1890.	1889.	1890.	1889.	1890.	1889.	1890.		
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	
Superphosphate	.....	.....	0.9	.....	6.4	.....	20.4	9.1	4.6	$3 50
Potash	.....	.....	.....	.....	15.4	.....	5.4	2.4	2.9	3 50
Nitrate soda	2.4	2.8	.....	8.1	.....	7.6	.....	.....	2 4	3 50
" and superphosphate	5.6	3.7	.....	7.5	11.4	6.0	9.7	9.0	8.8	7 00
Superphosphate and potash	3.8	3.2	.....	.....	.....	14.5	16.1	9.4	5.9	7 00
Nitrate and potash	7.1	7.6	3.8	8.4	.....	2.4	8.3	11.9	6.2	7 00
Superphosphate, potash and nitrate	7.8	2.9	5.3	1.2	.....	5.8	11.5	10.4	5.6	10 50
Barnyard manure	9.0	2.9	14.7	7.0	3.2	8.2	18.0	26.4	11.2	....
Land plaster	.....	.....	2 2	.....	.....	.....	9.6	2.0	1 7	.....

CONCLUSIONS.

In summing up the experiments of 1889, the following language was used:

(1.) *On soils capable of producing fifty bushels of shelled corn per acre with good drainage and tillage, no artificial fertilizer or combination of such fertilizers is likely to produce sufficient increase of crop to pay the cost of the fertilizer in the crop to which it is applied, at present prices of corn and fertilizing materials, respectively.*

(2.) *On soils that are decidedly deficient in natural fertility, phosphoric acid may sometimes be used with profit in fertilizing for corn, and potash and nitrogen may be so used in rare instances, and this whether these substances be used separately or in combination.*

It is true that these conclusions are based upon the experiment of a single season only, and therefore they must be held subject to modification or reversal by more extended experience. It is probable, however, that such experience will tend rather towards confirming than reversing them.

It will be seen that this season's work would justify a still more sweeping statement than the foregoing.

SUMMARY.

1. *Varieties*—(*a.*) From the large yellow dent class only a few are recommended for Ohio soil, namely: Big Buckeye, Leaming, Leaming Improved, Murdock's Yellow Dent and Woodworth's Yellow Dent. From among these the Leaming or Leaming Improved might be selected as the most prolific.

(*b.*) Briar Crest Beauty, Chester County Mammoth, Golden Beauty, Golden Dent and Cloud's Early Dent are large and productive varieties, but can not be relied upon to mature on Ohio soils.

(*c.*) Golden Dent and Golden Beauty are believed to be one and the same variety. The Leaming and Leaming Improved do not show any marked variation in point of productiveness, and it is questionable whether the one has any advantage over the other.

(*d.*) The Clarage from among the medium dents and the Butcher corn from the mixed dents are both good varieties, and will mature in an ordinary season.

(*e.*) The Farmers' Favorite is a good yielder, but has failed to mature this season. This we think was entirely due to the short and unfavorable season.

(*f.*) From the list of white dents should be excluded Blount's White Prolific and Old Cabin Home, on account of their failure to mature. They require a longer season than our latitude affords.

2. *Distribution of seed*—(*a.*) The results of previous experiments are confirmed by the work of this year in showing that more and better corn can be raised to the acre where the stalks average twelve inches apart than where they are at less or greater distances.

(*b.*) The results in general are as good where the corn is planted in hills as when planted in drills, when the average distances of the grains or stalks are the same.

3. *Seed from different parts of the ear*—The results of four years' comparative test fail to show any marked superiority in the productiveness of seed taken from the butt, middle or tip of the ear.

4. *Deep and shallow cultivation*—The results of two years' experiments are slightly in favor of shallow culture.

5. *Methods of harvesting*—The exact stage of maturity at which corn is cut may materially affect its final yield per acre.

6. *Varieties of ensilage corn*—Red Cob Ensilage, Blount's White Prolific and B. & W. are good varieties for the silo. Early Sanford and sweet fodder corn are not as a rule profitable in this State for silo purposes.

Corn intended for the silo should be planted previous to the middle of May to insure a sufficient degree of maturity.

7. *Fertilizers on corn*—The results of two years' experiment, conducted on the Station farm and in various sections of the State, indicate that the use of commercial fertilizers on corn, at present prices of grain and fertilizers respectively, is likely to result in loss more often than in profit.

CHAS. E THORNE, *Director*,

J. FREMONT HICKMAN. *Agriculturist.*